passing through the beam splitter 93 into a parallel light, a mirror block 96 for reflecting the laser beam collimated by the collimator 95 in a direction of right angles, and an objective lens 97 for collecting the laser beam reflected from the mirror block 96 on a predetermined position of a recording surface of the optical disc. Also arranged is a lens 94 for collecting the laser beam reflected in a direction of right angles from the laser beam running toward the collimator 95 on a light receiving surface of the light detector 92. It follows that an optical path for irradiating an optical disc in a predetermined position with a laser beam is formed between the laser diode 91 (IOU) and the objective lens 97.

Page 3, delete the whole paragraph starting at line 19 and replace it with the following new paragraph:

Specifically, the laser diode 91 is operated on the basis of the driving signal generated from the laser driving circuit member 98. The laser beam emitted from the laser diode 91 is incident on the beam splitter 93. A predetermined proportion of the laser beam incident on the beam splitter 93 passes through the beam splitter 93 so as to be guided to the mirror block 96. The beam guided to the mirror block 96 is reflected toward the objective lens 97 so as to be collected on a predetermined position on the recording surface of an optical disc D. On the other hand, that portion of the laser beam which is incident on the beam splitter 93 and is not reflected toward the mirror block 96 is reflected toward the monitor light detector 92.

Page 5, delete the whole paragraph starting at line 17 and replace it with the following new paragraph:

Also, since the optical disc of a DVD type has been put to a practical use, it is desired that the recording of data on optical discs such as a CD-R and a CD-DW capable of reproducing a CD disc for music or capable of recording data with a CD type optical disc be performed in a single optical disc in an optical disc apparatus capable of reproducing a DVD type optical disc. Under the circumstances, the optical head is required to be further miniaturized and to be made thinner.

Page 6, delete the whole paragraph starting at line 2 and replace it with the following new paragraph:

An object of the present invention is to provide a miniaturized optical head capable of overcoming the restriction in the mounting layout of parts and suitable for mounting in a thin optical disc apparatus.

Page 6, delete the whole paragraph starting at line 7 and replace it with the following new paragraph:

A6 Another object of the present invention is to provide an optical head, which can be housed in a thin optical disc apparatus, the optical head being capable of reproducing a DVD disc and a CD disc, and capable of recording data in optical discs in which data can be recorded such as a CD-R disc and a CD-RW disc.

Page 7, delete the whole paragraph starting at line 15 and replace it with the following new paragraph:

A7 According to a second aspect of the present invention, there is provided an optical head used in an optical disc apparatus in which an optical disc is irradiated with a light beam for recording data in the optical disc or for reproducing data from the optical disc, at least one of a circuit member and an element for reproducing or recording data being housed in the optical head, comprising:

Page 8, delete the whole paragraph starting at line 11 and replace it with the following new paragraph:

A8 a light source driving circuit member which comprises the light source driving circuit for driving the light source;

Page 8, delete the whole paragraph starting at line 14 and replace it with the following new paragraph:

A9 a signal processing circuit member which comprises the signal processing circuit for processing the electric signal from the light receiving element;

Page 8, delete the whole paragraph starting at line 17 and replace it with the following new paragraph:

A10 a driving mechanism driving circuit for driving the driving mechanism; and

Page 8, delete the whole paragraph starting at line 19 and replace it with the following new paragraph:

A11 a holding member for holding at least one of the driving circuit member, the light source driving circuit member, the signal processing circuit member, and the driving mechanism driving circuit member within the open portion of the base in parallel manner to the optical path within the base and in a manner not to interfere with the optical path within the base.

Page 11, delete the whole paragraph starting at line 3 and replace it with the following new paragraph:

A12 FIG. 5 schematically shows an embodiment of the present invention where a laser driving circuit member is set on the base as viewed from the rear side, which is shown in FIG. 3;

Page 11, delete the whole paragraph starting at line 8 and replace it with the following new paragraph:

A13 FIG. 7 is a plan view schematically showing an embodiment of the present invention where base shown in FIGS. 2 to 6 is incorporated in a motor base of an optical disc apparatus;

Page 11, delete the whole paragraph starting at line 12 and replace it with the following new paragraph:

A14 FIG. 8 schematically explains an embodiment of the present invention where the motor base shown in FIG. 7 is assembled with the optical disc apparatus;

Page 11, delete the whole paragraph starting at line 15 and replace it with the following new paragraph:

A15 FIG. 9A is a plan view showing an embodiment of the present invention where an optical head differing from the optical head shown in FIGS. 1A and 1B is observed in a direction parallel to the recording surface of the optical disc;

Page 11, delete the whole paragraph starting at line 19 and replace it with the following new paragraph:

A16 FIG. 9B is a side view showing an embodiment of the present invention where the optical head shown in FIG. 9A is observed in a direction perpendicular to the recording surface of the optical disc;

Page 11, delete the whole paragraph starting at line 23 and replace it with the following new paragraph:

A17 FIG. 10A is a plan view showing an embodiment of the present invention where the optical head applied to a known large optical disc apparatus is observed in a direction parallel to the recording surface of the optical disc;

Page 11, delete the whole paragraph starting at line 27 and replace it with the following new paragraph:

A18 FIG. 10B is a side view showing an embodiment of the present invention where the optical head shown in FIG. 10A is observed in a direction perpendicular to the recording surface of the optical disc;

Page 12, delete the whole paragraph starting at line 8 and replace it with the following new paragraph:

FIG. 12 schematically illustrates the configuration of the main constituents of another optical head, which can be applied to the optical head shown in FIGS. 1A, 1B, 2 to 6, 9A and 9B;

Page 15, delete the whole paragraph starting at line 10 and replace it with the following new paragraph:

On the other hand, a second IOU 20 for DVD is arranged in a predetermined position within the open portion 102 of the base 101 in a direction substantially perpendicular to the line joining the laser diode 11 of the IOU 10, the light detector 12 and the beam splitter 14. The second IOU 20 has a laser diode 21 emitting a laser beam having a second wavelength, which can be applied to an optical disc of a DVD type, and a light detector 22 formed integrally with the laser diode 21. The laser beam of the second wavelength emitted from the laser diode 21 is reflected from the optical disc and the reflected second laser beam is received by the light detector 22.

Page 17, delete the whole paragraph starting at line 6 and replace it with the following new paragraph:

The format of the CD type is capable of application to a CD-R and a CD-RW capable of recording. Where CD-R or CD-RW is mounted, the laser beam for CD permits recording data by changing the structure of the recording surface to cause the reflected light to have two different intensities.

Page 17, delete the whole paragraph starting at line 27 and replace it with the following new paragraph:

If the optical disc D conforms with DVD standards, the laser beam collected on the recording surface is reflected by the recording surface of the optical disc D so as to be brought back to the objective lens 13. The laser beam is then converted into a parallel light by the objective lens 13 and, then, further reflected by the mirror block 16 so as to be brought back to the beam splitter 14. The reflected laser beam that is brought back to the beam splitter 14 is reflected toward the IOU 20 for DVD by the function of the dichroic film of the beam splitter 14.

Page 18, delete the whole paragraph starting at line 11 and replace it with the following new paragraph:

The reflected laser beam guided to the IOU 20 for DVD is received by the light detector 22 of the IOU 20 for DVD so as to be converted into an electric signal. Then, the electric is processed in a signal processing circuit shown in, for example, FIG. 17, so as to be

converted into an RF signal (reproduction signal), a focus error signal and a tracking error signal. These converted signals are output. Incidentally, the RF signal is output from the optical head so as to be reproduced as a data signal by a digital signal processing circuit (not shown) within the optical disc apparatus. On the other hand, the focus error signal and the tracking error signal are utilized for the known focus control for aligning the distance between the position of the objective lens 13 and the recording surface of the optical disc D with the focus point of the objective lens 13 and for the known tracking control for aligning the center of the laser beam passing through a predetermined position of the objective lens 13 so as to be collected on the recording surface.

Page 20, delete the whole paragraph starting at line 6 and replace it with the following new paragraph:

The reflected laser beam guided to the light detector 12 included in the IOU 10 for CD is converted into an electric signal by the light detector 12 and, then, processed by the signal processing circuit shown in, for example, FIG. 17, so as to generate predetermined electric signals capable of forming an RF signal (reproduction signal), a focus error signal and a tracking error signal.

Page 21, delete the whole paragraph starting at line 11 and replace it with the following new paragraph:

As described above, the optical head 100 shown in FIGS. 1A and 1B is capable of coping with discs of different formats, and, thus, is configured so that a plurality of optical systems such as IOU are housed in a single base 101. Therefore, when the head is miniaturized, the layout of the parts housed within the optical head 100 is restricted.

Page 21, delete the whole paragraph starting at line 18 and replace it with the following new paragraph:

In the optical head 100, the open portion 102 in which the optical path is arranged is increased with an increase in the optical path. The open portion is a relatively large space within the optical head 100, and components other than the optical components forming the optical path are not disposed in the open portion.

Page 21, delete the whole paragraph starting at line 25 and replace it with the following new paragraph:

Under the circumstances, in the optical head 100 shown in FIGS. 1A and 1B, attention is paid to the space in which is arranged the optical path of the laser beam ranging between

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the laser diode 11 and the objective lens 13, and members for controlling the data recording in and data reproduction from the optical disc D are arranged appropriately in the open portion 102, in which the optical path is arranged, of the optical head 100.

Page 23, delete the whole paragraph starting at line 16 and replace it with the following new paragraph:

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Also, in the optical head 100 shown in FIGS. 1A and 1B, the laser beam emitted from the laser diode 11 of the IOU 10 for CD is gradually diverged along the optical path. In other words, the laser beam has a small diameter on the emitting side near the light source. Therefore, relatively large members can be arranged if the monitor light detector 17, the laser driving circuit member 18, the actuator driver or the signal processing circuit are arranged in the space on the emitting side of the open portion 102 near the light source.

Page 30, delete the whole paragraph starting at line 26 and replace it with the following new paragraph:

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On the other hand, the monitor light detector 202 is mounted to the flexible printed circuit board 206 and is fixed to the base 216. Incidentally, as shown in FIG. 6, the laser driving circuit 217 and the monitor light detector 202 are arranged in parallel to the laser beam Bm and held so as not to interfere with the optical path of the laser beam Bm. In the optical head 200 shown in FIGS. 2 to 6, the laser driving circuit 217 and the monitor light detector 202 are arranged in parallel along the optical path ranging between the IOU 211 for DVD and the collimator 210. However, the laser driving circuit 217 and the monitor light detector 202 may be arranged anywhere desired as far as the laser driving circuit 217 and the monitor light detector 202 extend in parallel to the optical path of the laser beam ranging between the laser diode and the objective lens.

Page 32, delete the whole paragraph starting at line 2 and replace it with the following new paragraph:

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As described above, in the optical head shown in FIGS. 2 to 6, the monitor light detector 202 is arranged above the beam splitter 208 and the laser driving circuit 217 is arranged below the beam splitter 208. It follows that the monitor light detector 202 and the laser driving circuit 217 do not interfere with the laser beam Bm in the upper and lower portions of the beam splitter 208.

Page 35, delete the whole paragraph starting at line 22 and replace it with the following new paragraph:

As described above, the laser driving circuit member 18 is arranged in the vicinity of the IOU 10 for CD and within the space formed between the inclined portion of the optical path on the emitting position of the diverging laser beam Bm and the floor portion of the base 111 on the side away from the optical disc D with the optical path interposed therebetween, as illustrated by the optical head shown in FIGS. 9A and 9B.

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Page 36, delete the whole paragraph starting at line 20 and replace it with the following new paragraph:

FIG. 11 schematically shows in a dismantled fashion the main constituents of the optical head that can be utilized in any of the optical heads described with reference to FIGS. 1A and 1B, FIGS. 2 to 6, and FIGS. 9A and 9B.

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Page 42, delete the whole paragraph starting at line 14 and replace it with the following new paragraph:

FIG. 13A is a graph showing the relationships between the optical magnification and the light utilization and between the optical magnification and the power of the laser beam emitted from the objective lens in the case of using the optical head shown in FIG. 11. It is clearly seen that both the light utilization, graphed by curve "a," and the power of the laser beam emitted from the objective lens, which is graphed by curve "b," decrease with an increase in the optical magnification. Also, as apparent from the Gaussian distribution shown in FIG. 13B, the light utilization is improved with a decrease in the optical magnification so as to increase the emitting power of the objective lens. If the optical magnification is made unduly small, however, the beam loading rate is lowered and other factors are increased. For example, the influence of the aberration in the optical path represented by the astigmatism is increased. As a result, the quality of the beam spot collected on the recording surface of the optical disc is lowered. When it comes to the transmittance of the laser beam, the number of optical members arranged in the optical path in the case of the DVD/CD common use is larger than that in the case of the optical system used exclusively for the CD, leading to reduction in the transmittance of light in the optical path. Under the circumstances, the optical magnification for the CD system is finally set at 4 in the optical head 400 shown in FIG. 11.

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Page 49, delete the whole paragraph starting at line 18 and replace it with the following new paragraph:

On the other hand, the diverging angle of the laser beam for CD having a wavelength of 780 nm, which is emitted from the laser diode 561, is limited to a predetermined angle by

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